CHAPTER

9

Water Management Assistance Program

9.1 INTRODUCTION

The Arizona Department of Water Resources' Water Management Assistance Program (WMAP) is intended to provide financial and technical resources and to assist in the development and implementation of conservation programs, augmentation programs, and programs designed to monitor hydrologic conditions and assess water availability in the Active Management Area (AMA). Program resources will be focused on projects with the highest probability of contributing to the goal of safe-yield. This program is funded through a portion of the groundwater withdrawal fee paid annually by those who withdraw groundwater in the AMA.

Conservation assistance may take the form of financial assistance to water users proposing to undertake conservation programs or planning and technical support designed to increase water use efficiency across the AMA. Conservation assistance will continue to serve as a balance to enforcement actions related to conservation requirements during the third management period. Augmentation assistance may take the form of financial assistance to water users, providing them the means to study, design, and construct renewable resource facilities. Assistance may also take the form of planning and technical assistance designed to develop AMA-wide and local area management strategies. Monitoring activities include providing staff assistance and funds for water availability and subsidence monitoring studies.

The Arizona Department of Water Resources (Department) administers this program through the awarding of contracts to water users, universities, consultants, and other eligible persons, and through the provision of planning and technical assistance to water users. The Department also provides legal, financial, and administrative support to the contracts program.

In this chapter, the following topics are discussed in the order listed:

- Statutory Provisions
- The Department's Role in the Water Management Assistance Program
- Second Management Plan Program Summary and Assessment
- Third Management Plan Program Goals and Objectives
- Future Program Directions

9.2 STATUTORY PROVISIONS

9.2.1 Program Authorization and Funding

The Groundwater Code (Code) requires that the Third Management Plan include a program for "additional augmentation of the water supply of the active management area, if feasible, including incentives for artificial groundwater recharge," and a program for "conservation assistance to water users within the active management area." A.R.S. § 45-566(A)(6) and A.R.S. § 45-566(A)(8). Funding for these programs comes primarily from groundwater withdrawal fees levied and collected pursuant to A.R.S. § 45-611(C).

9.2.2 Withdrawal Fees

An annual groundwater withdrawal fee is levied and collected from each person withdrawing groundwater in an AMA from a non-exempt well. Withdrawal fees are authorized by the Code and are assessed on a per acre-foot basis of groundwater withdrawn and beneficially used. A.R.S. § 45-611(A)(2). Pursuant to A.R.S. § 45-614, by October 1 of each year, the director of the Department must set the groundwater

withdrawal fee for the following calendar year. For purposes of this WMAP, the Code sets a withdrawal fee cap of $2.00 per acre-foot of water withdrawn. The Code instructs that these fees be used to provide financial assistance for augmentation of the water supply, conservation assistance to water users, and for monitoring and assessing water availability within the AMA. The monitoring and assessment provision was added to the Code through a 1996 amendment.

The creation of the Arizona Water Banking Authority (AWBA) in 1996 signaled a dramatic shift in the funding levels for the WMAP. Beginning with the 1997 groundwater withdrawal fees (collected in 1998 to be used for the 1998 grant cycle), the first $2.50 per acre-foot of the established withdrawal fee is assigned to the AWBA to fund, in part, its activities. Under 1997 fee levels of $2.75 per acre-foot in the Phoenix AMA, $2.50 per acre-foot goes to the AWBA and $.25 per acre-foot is collected to support the WMAP. At average pumping levels of 900,000 acre-feet at $.25 per acre-foot, the WMAP will collect $225,000 annually. This is in contrast to pre-AWBA levels of approximately $1,400,000 collected annually for the WMAP. The director is authorized under A.R.S § 45-611(C)(2) to set that portion of the annual groundwater withdrawal fee used for conservation and augmentation assistance, and water availability monitoring at a maximum of $.50 per acre-foot. These conditions are statutorily set through the year 2016.

Total available funding for the program will vary from year to year depending on the amount of groundwater withdrawn and on any carry-over of unspent conservation assistance, augmentation, and monitoring monies from previous years.

Each AMA has a five-member Groundwater Users Advisory Council (GUAC) appointed by the governor to represent various sectors of the regulated water community. The GUAC makes recommendations to the director regarding how the fees should be set within the statutory limits. Withdrawal fees are collected annually with the Groundwater Withdrawal and Use Reports.

The Department began collecting withdrawal fees for this program for the 1990 calendar year. The assessment in the first year was to initiate the augmentation assistance program adopted as part of the Second Management Plan. In 1991, the Second Management Plan was modified to include a conservation assistance program, which also became eligible for funding.

Table 9-1 shows the total groundwater pumped, annual groundwater withdrawal fees, and total fees collected for the program from 1990 through 1997 in the Phoenix AMA.

9.3 THE DEPARTMENT'S ROLE IN WATER MANAGEMENT ASSISTANCE PROGRAM

The Department's role in the WMAP is to direct the program by identifying areas in need of technical or financial assistance, establishing assistance priorities, soliciting and reviewing applications, developing contractual arrangements with grantees, providing administrative and logistical support to contractors, reviewing contract deliverables, monitoring contract progress, and providing access to contract results.

9.3.1 Annual Assistance Priorities

In an effort to apply available funding and technical assistance to the most important projects, the AMA identifies annual program priorities. With assistance from members of the water-using community and the GUAC, high priority project categories are identified. Any applications for funding in these categories receive preference during the application review and selection process. The 1998 grant cycle incorporated for the first time a "must fund" category. The premise for this category was the determination that there were certain projects, due to their high priority, that would be carried out with financial support from this program or with technical assistance from the Department, regardless of whether an application was submitted. A more detailed discussion of annual priorities is found in section 9.4.4.1.1.

TABLE 9-1
GROUNDWATER WITHDRAWAL FEES COLLECTED FOR WATER MANAGEMENT ASSISTANCE PROGRAM PHOENIX ACTIVE MANAGEMENT AREA

Year	Groundwater Pumped (acre-feet)	Withdrawal Fee[1] (per acre-foot)	Money Collected[1]
1990	1,113,121	$1.00	$1,113,121
1991	915,900	$1.25	$1,144,876
1992	787,314	$1.60	$1,259,702
1993	927,467	$1.60	$1,483,947
1994	830,087	$1.75	$1,452,652
1995	774,655	$1.75	$1,355,646
1996	922,427	$1.75	$1,614,248
1997	914,286[2]	$ .25	$228,572[2]
Average	898,157	—	—

[1] Withdrawal Fees and Money Collected reflect only that portion of the groundwater withdrawal fee established to support the Water Management Assistance Program. Total withdrawal fees through 1997 have been greater than Table 9-1 fees, since the first one dollar per acre-foot of the annual withdrawal fee was established for general Department administrative purposes.

[2] Estimate (actual pumpage and fees not determined as of 5/20/98)

9.3.2 Application and Review Process

Water users from an extensive mailing list receive notice that the annual grant application process has begun. The notice identifies funding categories, priorities, application review criteria, application submittal and review schedules, and funding levels. Once applications are received, AMA staff conduct their review. AMA staff also provide logistical and technical support to the GUAC during their concurrent review. Generally, an initial screening of applications is conducted by the GUAC. Applications most consistent with the established funding priorities are retained for further consideration. Those applications making the "first cut" are invited to make a presentation to the GUAC. Subsequent to the presentations and application reviews, the GUAC selects which applications should receive funding and forwards their recommendations to the Department director. The director then makes the final determination as to which applications will be offered a contract.

9.3.3 Department of Water Resources' Directed Projects

Conservation, augmentation, and monitoring projects and proposals can be initiated at any time by the Department after receiving input from the GUAC or a public or private entity. The GUAC and Department staff analyze such proposals for consistency with the AMA's conservation, augmentation, and monitoring objectives and the applicable review criteria and make a recommendation to the director. To qualify for funding in this category, a clear and convincing demonstration must be made regarding why the proposal should be funded in advance of the next scheduled grant application cycle.

9.3.4 Contract Development

Each applicant receiving a favorable determination from the director is required to enter into a contractual agreement with the Department. The contract is prepared by Department staff, consistent with the applicant's proposal and scope development, and describes what is to be accomplished by the applicant for which reimbursement will occur.

9.3.5 Contract Monitoring and Support

Department staff track the progress of each contractor. Contract products are reviewed for consistency with contract requirements. Intermediate contract deliverables and review provisions are followed. Department staff authorize and issue payments, modify contracts as needed, and provide other legal and administrative support.

9.3.6 Clearinghouse

Each AMA acts as an information repository for all conservation, augmentation, and monitoring information generated from the contracts they administer. In addition to any information transfers or product dissemination requested in the contracts, the Department makes all information or products generated by contracts available to the public upon request.

The Department's Web site also serves as an information clearinghouse and the primary public venue for dissemination of current information on the assistance programs. Information gained through Department-sponsored programs, which are deemed to be regionally, statewide, and/or nationally transferable, will be placed on the Department's Web site and updated regularly. A future activity includes linking the Department's Web site to other pertinent Web sites. This will assist users in finding water conservation, water supply, and augmentation information from other sources.

A centralized clearinghouse could include a library of conservation and augmentation literature, detailed information on grants and contracts previously funded, and could provide information on centralized water conservation outreach activities.

9.4 SECOND MANAGEMENT PLAN PROGRAM SUMMARY AND ASSESSMENT

The fees collected during the second management period were used to fund conservation and augmentation grants, as well as to fund program administrative support staff in the Phoenix AMA. Typically, the Department advertised the availability of funds for grants each year, evaluated the grant proposals received, and awarded funds to projects that best met the program objectives.

From the beginning of this program in 1991 through the 1998 grant cycle, 91 grants have been awarded in the Phoenix AMA at a total funding amount of $6.5 million. Appendix 9 lists all grants awarded during the tenure of this program.

9.4.1 Conservation Assistance Program

The Second Management Plan identified four conservation categories to be the focus of the program:

- Information and Education
- Agricultural Users Program
- Municipal Users Program
- Industrial Users Program

The Second Management Plan required that a minimum of one conservation project be funded in each category during the second management period. Through the 1998 grant cycle, the Phoenix AMA had funded 62 conservation projects totaling $3,823,232. The number of grants in each of the conservation assistance funding categories and the funding amounts are listed in Table 9-2.

TABLE 9-2
CONSERVATION ASSISTANCE GRANTS AWARDED
PHOENIX ACTIVE MANAGEMENT AREA

Category	Number of Grants	Funding Totals
Information and Education	22	$454,090
Agricultural Users	10	1,282,965
Municipal Users	26	1,846,883
Industrial Users	4	239,294
Totals	62	**$3,823,232**

The types of projects funded included:

- Conservation Research and Planning - Eighteen grants totaling $993,746 were awarded to analyze water use activities (such as water use within single family homes, evaporative cooler use, and outdoor misting systems), develop innovative conservation practices and programs, and evaluate the effectiveness of conservation programs.

- Conservation Program Development and Implementation - Eight grants were awarded in this category, totaling $397,931. These grant programs focused primarily on plumbing retrofit programs for senior citizens and low income neighborhoods.

- Xeriscape™ Demonstration Gardens/Design Guides - Five grants totaling $739,500 were awarded in this category. The objective in this category was to display low water use plants in a highly visible public setting to encourage others to plant low water use landscapes and to provide low water use landscape design guides to single family homeowners to encourage more water efficient residential landscapes.

- Agricultural Conservation and Crop Water Use Studies - Nine grants totaling $1,237,965 were awarded. On-site water management assistance was provided on farms in the East and West Salt River Valley Subbasins, and research on the consumptive use of cotton was conducted.

- Information and Education - Twenty-two grants totaling $454,090 were awarded in this category. Teaching and training various segments of the water-using community were the primary activities in this category. Workshops, training sessions, school curriculum, information dissemination, and displays and promotions were utilized to educate water users and students on conservation.

9.4.2 Augmentation Assistance Program

The Second Management Plan identified two broad funding categories for augmentation grants. Category I included construction and implementation projects designed to directly increase water supplies or water storage. Demonstration and pilot augmentation (recharge) projects fell into this category. Category II included planning, research, and feasibility studies. This category included studies of new technology, selection of future project sites, and resolution of technical and institutional barriers to augmentation and

recharge. In addition to these two categories, the Second Management Plan originally contained restrictions on the amount of augmentation money that could be spent in each category. A 1996 modification to the Second Management Plan eliminated all such categories and restrictions and now allows the GUAC to recommend any level of funding for either studies or construction projects.

Through the 1997 grant cycle, the Phoenix AMA has funded 29 augmentation projects totaling approximately $2,647,000. The number of augmentation grants and the types of grants are described below:

- Augmentation Research and Planning - Three grants totaling $273,600 were funded in this category.

- Recharge Research, Demonstration, and Construction - Fifteen grants totaling $1,081,537 were awarded in this category. Various research projects regarding recharge technology, hydrologic feasibility of recharge sites, and recharge demonstration projects were the focus in this category. Central Arizona Project water and effluent recharge projects were studied and constructed with assistance from this fund.

- Water Quality Enhancement and Reuse - Eleven grants were awarded in this category for a total of $1,291,977. Research on constructed wetlands designed to treat effluent, effluent reuse, and greywater use were the primary focus in this category.

9.4.3 Monitoring and Assessing Water Availability Program

Statutory authorization making monitoring and water availability assessments fundable under this program was given in 1996. Projects that may be funded in this new category include water measurement, aquifer and geohydrologic studies, land subsidence monitoring, and aquifer compaction studies. Projects in this category are not required to follow the previously described grant funding process. The Department may requisition funds from the withdrawal fee account if, in the opinion of the Department, such a project is critical to the needs of the agency. Funding of up to $200,000 has been encumbered to develop a Phoenix AMA land subsidence monitoring network. The Pinal and Tucson AMAs have also contributed funding for the monitoring program to be included in those areas.

9.4.4 Second Management Plan Program Assessment

The WMAP has been in operation for seven years. As previously described, many projects in several categories have been funded under this program. This section will generally assess the accomplishments of the program and the assessment will be used to reaffirm or reshape the program, as necessary, for the third management period. This general program assessment was conducted for the following reasons:

- During the third management period, the program will experience a 70 to 86 percent reduction in funding due to the creation of the AWBA. This significant reduction in funding levels demanded an assessment of the program direction.

- The recognition that the AMA is not making as much progress as anticipated toward achieving safe-yield will cause a reevaluation of all programs, including the WMAP.

- Much time and money have been invested in this program. With that investment, it is good policy to determine what has been successful to provide direction for future program efforts.

9.4.4.1 Goal and Objectives Attainment

The goal of the WMAP during the second management period was to assist water users or others in achieving the conservation requirements of the management plan and in developing augmentation and recharge projects to maximize the use of renewable resources. This was to be achieved by: (1) identifying and carrying out high priority projects, (2) providing funds for the development of such programs, (3) acting as a central source of information, and (4) increasing public awareness of the importance of water conservation and renewable resource development.

9.4.4.1.1 Priority Projects

As previously described, the AMA establishes annual funding priorities based on consultation with the GUAC and other members of the water-using community. Applications for funding under these priority categories receive stronger consideration in the review and selection process. Conservation assistance and augmentation assistance compete equally for funding. During the first four years of this program, funding priorities were not set. Any application that met the Second Management Plan review criteria had an equal opportunity for funding. Beginning with the 1995 grant cycle, the Department began considering priorities when awarding grants. Table 9-3 identifies the annual program priorities.

Applications were received and contracts were awarded in many of the priority categories for the past three years. Many conservation assistance grants have directly assisted users in achieving their conservation requirements. Direct application of improved on-field agricultural water management techniques, residential plumbing retrofits, industrial conservation programs, and public housing and multifamily housing retrofits have all taken place, with varying levels of savings estimated. Numerous conservation research, planning, and demonstration projects have been completed that have led to full-scale implementation of conservation programs. In most cases, savings determinations are difficult to obtain and the long-term implications are unknown. Certain priority offerings received little or no applicant interest.

9.4.4.1.2 Providing Funds

The Department has made all funds collected for this program available for award; however, a small percentage of total funds collected is used by the Department to provide legal and administrative support to the program. Although all funds collected have been made available, all funding has not been awarded. In most years, the amount of funding available has exceeded the amount requested by applicants receiving GUAC recommendation. As a result, the program has established an "unencumbered balance." Given the existence of the unencumbered balance and the dramatic reduction in funding for this program due to the AWBA, the Department will develop a strategy for the third management period that integrates the lesser annual funding levels with the unencumbered balance. The Department will also consider a funding cycle strategy that may operate on "less than an annual cycle." This combination should allow the Department to retain the program and assist the AMA in moving toward safe-yield.

9.4.4.1.3 Central Source of Information

Many research documents, feasibility studies, and program implementation reports have been submitted to the Department. In addition to serving the needs of the contractors, this information is available to any interested water user. The Department is developing a Web site to serve as a central information repository and clearinghouse.

TABLE 9-3
ANNUAL PROGRAM PRIORITIES
PHOENIX ACTIVE MANAGEMENT AREA

1991 - 1994	Open categories/no priorities
1995	Innovative agriculture scheduling technologies
	Promotion of low water use landscaping
	Conservation potential for commercial, industrial, and multifamily residential water users
	Conservation assistance for small municipal providers
	Feasibility studies for recharge
	Feasibility studies for effluent use
1996	Regional planning for renewable water supply development
	Assistance to agricultural users to increase use of renewable water
	Regional recharge plan
	Irrigation district distribution system efficiency improvement
	Junior High water resources curriculum
	Point-of-purchase water conservation promotion.
1997	Funded continuation of existing projects only
1998	Do-it-yourself low water use landscape guide
	Critical area strategy development
	Front-loading clothes washer rebate/promotion
	Golf course water use–edge effect, slope, salinity
Other Priorities	Conservation advertising campaign Urban irrigation system scheduling Greywater use - obstacles Irrigation district efficiency improvements

9.4.4.1.4 Increasing Public Awareness

Through the education grants workshops, training sessions, school curriculum, information dissemination, and various promotions offered in this program, the public was made aware of the need for conservation and renewable resource development.

9.4.4.2 Summary Assessment

Overall, the WMAP has been successful in contributing to water use efficiency and the development of renewable supplies. Most grantees performed well and Department and AMA staff did a commendable

job of managing this program. Areas requiring additional attention during the third management period are:

- In many instances, the priorities established did not result in good project submittals.
- Significant difficulties were experienced with certain contractors with respect to schedules, deliverables, and other contractual difficulties.
- Significant reductions in funding (beginning in the 1998 grant cycle) need to be analyzed to determine how the WMAP will be impacted.

9.5 THIRD MANAGEMENT PERIOD PROGRAM GOALS AND OBJECTIVES

The Phoenix AMA conservation and augmentation funds supported many programs and contracts during the second management period. As incoming funds decline, the AMA will need to further focus its resources on areas that provide the most benefit to the AMA.

During the third management period, the Department, with input from the GUAC, may take a more active role in directing how funds are utilized. This may include a list of projects that need to be funded through a Request for Proposals mechanism, in addition to the current grant-based approach. Assessment of program effectiveness and transferability of information are particularly important as the monies available for assistance decline.

9.5.1 Conservation Assistance Program Goal

The goal of the Conservation Assistance Program is to assist water users or other eligible persons within the Phoenix AMA in achieving the conservation requirements of the current management plan. The Department will meet this goal by working toward the following program objectives:

- Identify high priority funding areas, in consultation with the GUAC and the water-using community, and administer priority programs.
- Provide funds for the development of such conservation assistance programs for agricultural, municipal, and industrial water users and for information and education on water conservation.
- Act as a central source for information on water conservation.
- Increase public awareness of the importance of water conservation.

9.5.2 Augmentation Assistance Program Goal

The goal of the Augmentation Assistance Program is to assist water users or other eligible persons within the Phoenix AMA in developing augmentation and recharge projects to maximize the use of renewable sources of water such as Central Arizona Project, other surface water, and effluent. The Department will meet this goal by working toward the following program objectives:

- Identify high priority funding areas, in consultation with the GUAC and the water-using community, and administer priority programs.
- Provide funds for the planning, design, and construction of such augmentation and recharge projects.
- Act as a central source for information on augmentation and recharge.
- Increase public awareness of the importance of augmenting the AMA's groundwater supplies.

9.5.3 Monitoring and Assessing Water Availability

The goal of this program is to assist in identifying, establishing, and implementing programs that monitor and assess the hydrologic conditions and the potential impacts of continued groundwater pumping and water level declines.

9.6 ALLOCATION OF PROGRAM FUNDS

The AMA makes initial recommendations to the GUAC on fund allocation based on the need to implement particular programs for the benefit of the AMA. The GUAC in turn provides the Department with recommendations on how the WMAP fund will be allocated among the three program categories (conservation assistance, augmentation assistance, and monitoring activities).

9.6.1 Fund Categories

Conservation and augmentation assistance and monitoring activities must be targeted based on program goals and objectives and AMA priorities. The following types of assistance could be provided through grants, professional contracts, or direct staff assistance.

- Planning, research, and feasibility studies
- Demonstration and pilot projects
- Technical assistance
- Information and education materials
- Conservation devices and technology
- Testing and monitoring
- Construction of augmentation facilities
- Monitoring equipment
- Monitoring and assessment activities

9.6.2 Project Selection

The decision-making process in selecting a project for funding must allow for a great deal of flexibility. During the third management period, changes may occur in water use patterns, technological advances, social values, institutional constraints, and the economic viability of conservation or efficiency measures. Due to this potential for change, it is impractical at this time to determine the type of projects that merit funding. The second management period project selection process has proven to be flexible, as well as politically and publicly responsive. This has been accomplished by involving the full participation of the GUAC. The GUAC's regularly scheduled meetings provide an excellent forum for public review and comment on projects and proposals. This process will be continued during the third management period.

Projects other than grants can be initiated at any time by the Department after receiving input from the GUAC or a public or private entity. The GUAC and Department staff will analyze such proposals for consistency with the AMA's conservation, augmentation, and monitoring objectives and the evaluation criteria, as applicable, and make a recommendation to the director. A clear and convincing demonstration regarding why the proposal should not wait for the next grant cycle will be required.

If the Department determines that grant funds will be available in a given funding cycle, it will provide notice to water users and other interested parties of the procedures for soliciting grant project proposals. Proposals are solicited for all three grant categories (conservation assistance, augmentation assistance, and monitoring and water availability studies). The Department may also submit its own projects for consideration. The priorities that will be used by the GUAC and the director in selecting projects to be funded will be determined prior to commencing the project solicitation process. Applicants may be invited

to give a presentation for the GUAC and to address any concerns or issues that need clarification. Using the evaluation criteria set forth below, the proposals will be reviewed by AMA staff, the GUAC, and outside reviewers as appropriate. The GUAC will then recommend projects for funding to the director. If the GUAC recommends a project proposed by the Department, the GUAC may also recommend whether the project should be implemented by the Department or another entity based on an evaluation of efficiency, effectiveness, and short-term and long-term benefits to the AMA. The GUAC may choose to give special preference to priority projects and may declare a "must fund" project which would receive first consideration for funding. These priorities may change from year to year. The director will then consider the GUAC and AMA staff recommendations and determine which projects should be funded.

9.6.2.1 Selection Criteria

Each application will be evaluated according to the criteria established by the Department in consultation with the GUAC. Evaluation criteria shall include, but are not limited to:

1. Compatibility of the project with the Department's policies and programs and the management goal of the Phoenix AMA.

2. Compliance of the project with applicable federal, state, and local laws and regulations.

3. Cost-effectiveness of the project. Ability to combine the project with proposed or ongoing projects resulting in cost and human resource savings. Ability of the project proponent to obtain matching funds for the project. Extent to which the applicant is contributing to the cost of the project (e.g., in-kind or cash). Predicted water demand reduction–extent and duration of reduction relative to project costs.

4. Extent to which the type of project is applicable to other users, other sectors, and other AMAs. Demonstrated sector commitment to participate in the project. For example, if the proposal is written to serve a particular sector such as agriculture, it must have been developed or supported by the agricultural interests it addresses.

5. Likelihood of community support for the project. Significance of the project's potential economic, environmental, and social impacts.

6. Extent to which the type of project has previously been proven feasible and effective, or extent to which implementation of the project will provide information on feasibility and effectiveness, if not previously proven.

7. Demonstrated need–is it likely the project would not be implemented without water management assistance funding?

8. Ability to monitor demand reductions during and after implementation of the project. Ability to produce documented comparisons of pre-project and post-project water savings, scientific data collection and reporting methods, or pre-program and post-program surveys to verify project results.

9. Capabilities of project proponents to successfully implement project. Applicant has experience and past success with similar projects. Past performance of project proponent with regard to implementing grant projects.

10. Effectiveness of proposal–includes factors such as a clear statement of purpose, goals, methodology, and list of deliverables (data collection, interim and final reports, etc.). Contains

background on current and historic water use, if applicable. The proposal is innovative and includes sufficiently researched budget information to determine if the requested funding is warranted (e.g., salary costs and benefits, retrofit device costs, equipment purchases, and supplies).

11. Timely, efficient development of alternative renewable water supplies. Potential to contribute to regional or critical area water management solutions.

12. Likelihood of developing transferable information or technology.

The Department will coordinate with other Arizona agencies and organizations possessing water management authority, such as the Arizona Department of Environmental Quality, through a review and comment process to ensure that these agencies and organizations are aware of the proposed project and are allowed time to assess any impacts of the proposed project.

9.7 FUTURE PROGRAM DIRECTION

The future of the WMAP will be influenced and shaped by many considerations. The next ten years will be crucial years in the Department's effort to achieve the management plan goal of safe-yield. Key considerations in the structure of the third management period program will be:

- Reduced program funding
- Program goals and objectives
- Program priorities

9.7.1 Reduced Program Funding

As described in section 9.2.2, the existence of the AWBA will dramatically reduce the amounts of program funding available to the Phoenix AMA. This is occurring at a time when there is a growing need by AMA water users to develop and expand water conservation and augmentation programs. In light of this situation, it is important that full consideration be given to maximizing withdrawal fees within current legislative limits and to the strategic use of current unencumbered program fund balances. A combination of annual withdrawal fees and some percentage of the unencumbered balance will be used annually to sustain this needed program throughout the third management period. The level of funding and the combination of funding resources should be tied to agency planning and program development needs, necessary levels of agency administrative support, and funding priorities. The possibility of future legislative authorizations to increase the groundwater withdrawal fee should also be considered.

The Department will continue to participate in financial or in-kind partnerships with other agencies, municipalities, businesses, and utilities to allow the Department to continue to promote conservation, augmentation, and monitoring activities with fewer available funds. The Department may also need to look to other sources of funding, such as special legislatively funded studies and projects. The AMA may need to reevaluate the level of assistance it has provided in the past and focus primarily on providing seed money for projects or target funds to demonstration or feasibility projects which may be lower cost. The AMA could also direct funds toward a very limited number of priority projects and defer grant disbursal in some years in order to build up sufficient funds to support key projects.

9.7.2 Relationship of Assistance Programs to AMA Program Goals and Planning Efforts

As the Department continues its efforts to facilitate increased utilization of renewable water supplies in concert with water conservation, funds could be allocated to promote the goals and objectives of its regulatory programs. The "Future Directions" sections of chapters 4, 5, 6, 7, 8, and 12 identify specific

needs that could be addressed with assistance funds. These research and assistance needs are summarized in this section.

The municipal, agricultural, and industrial programs all demonstrate the need for assistance in expanding the utilization of renewable water supplies and for funds for continued conservation assistance and education as described below.

- Municipal program needs include the evaluation of effectiveness of conservation programs and funding of programs that result in significant long-term savings. This may involve focusing funds on conservation research or evaluation projects as well as implementation programs. Urban landscape design, private water company participation, and a water issue awareness campaign are important areas.

- Agricultural program needs include irrigation water management assistance to farmers, installation of efficient irrigation systems, and infrastructure to convey renewable supplies to farms. Other agricultural needs identified were the need to monitor crop and water use patterns and to evaluate the impact of market conditions and regulatory programs on farming operations.

- Industrial needs include developing opportunities and planning assistance for renewable supply use. For turf-related facilities, research involving evaluation of the application rate and of new irrigation technologies is needed. For cooling towers, further research on the impact of effluent and Central Arizona Project water on cooling tower operation, the use of blowdown water for irrigation, and further investigation of cooling tower maintenance technologies is needed.

- Monitoring and assessment activities must be expanded to understand the contributions of the water-using sectors to reaching safe-yield. It is also important to develop strategies to reach the goal of safe-yield in the context of the hydrologic conditions in the AMA. It is necessary to understand groundwater movement, volumes, locations of groundwater recharge and depletions, and the location and movement of poor quality water to develop a hydrologic model to understand the long-term policies necessary to reach safe-yield. Monitoring and assessment activities are also critical to developing water management strategies that take localized water conditions into account.

As each of these programs will be designed to address AMA-wide water management issues, each can also be considered for assistance as critical area strategies are developed.

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Agriculture Conservation and Crop Water Use Studies			
Irrigation Water Conservation and Water Use Study IGA92-7956 CA93PHA15 CA93PHA16 CA95PHA02 CA96PHA28 CA96PHA29 CA97PHA02 CA98PHA29 1992, 1993, 1995, 1996, 1997, 1998	Central Arizona Water Conservation Management Program (WCMP) - East Maricopa, Agua Fria-New River and Buckeye-Roosevelt Natural Resources Conservation Districts (NRCD)	The WCMP provides services to assist both farmers and urban irrigation users with improving the efficiency of their irrigation programs. The original program funded in 1992 was specifically confined to the West Valley area. In 1993, the WCMP expanded their service area to cover the entire East and West Valley.	 $187,665 $121,191 $168,880 $88,228 $41,567 $191,262 $154,426 $167,121
Upland Cotton Feasibility and Water Use Study CA95PHA16 1995	University of Arizona	This grant funded a study of several short season cotton varieties. The objective of the study was to determine the quality and feasibility of each variety of cotton while making a comparison of consumptive water use for short season cotton versus long season cotton.	 $117,625
Total Category Funding			**$1,237,965**

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Augmentation Research and Planning			
Future Use of Central Arizona Project Water in Sun City - Study AUG98PH04 1998	Sun City Home Owners Association	This grant will provide funding for a study which will determine the appropriate future use of Central Arizona Project (CAP) water in the Sun City area; and to organize an education program to communicate the future need for CAP water and the plans to make effective use of it.	$48,600
Shallow Groundwater Management Strategies - Feasibility Study AUG98PH05 1998	City of Chandler	A feasibility study which will seek to develop strategies to manage rising, shallow, poor quality groundwater resulting from natural recharge, return flows and artificial recharge. An emphasis will be on reuse of the shallow groundwater.	$75,000
WESTCAPS / City of Glendale AUG96PH13 1996	WESTCAPS and City of Glendale	The purpose of this grant is to provide partial funding for the creation of a Water Resources Director position to coordinate planning efforts of the West Valley Central Arizona Project Subcontractors' Coalition (WESTCAPS). The director's primary duty shall be to establish and implement a regional planning process to identify, develop, evaluate and recommend courses of action to facilitate the use of CAP water in the West Valley.	$150,000
Total Category Funding			**$273,600**

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Conservation Program Development and Implementation			
Industrial and Commercial Retrofit Incentive Program CA95PHM18 1995	City of Tempe	The City of Tempe requested funding to develop and implement a financial incentive program to encourage industrial and commercial water users to implement water conservation measures. The intent of the grant was to provide financial rebates for projects that anticipated a water savings of fifteen percent or more of the total water used at the facility.	$100,000
Neighbors Helping Neighbors Program CA94PHM18 CA95PHM27 CA96PHM50 1994, 1995, 1996	Phoenix Revitalization Corporation and Labor's Community Service Agency	The goals of this program were threefold: (1) to promote and assist residents in achieving water conservation in geographic areas with historic high water consumption, economic hardship and a high level of criminal activity; (2) to provide a catalyst and vehicle for neighborhood self-help; and (3) to provide job training and employment opportunities for local residents, particularly youths at risk for gang involvement.	$45,000 $78,100 $48,541
Public Housing Retrofit Program CA94PHM46 1994	City of Peoria	The City of Peoria conducted a water conservation plumbing/retrofit program for 150 public housing units. Department funding was used to partially fund the fixtures used in the retrofit kits.	$4,000
Seniors Helping Seniors Program CA92PHM14 CA95PHM25 CA97PHM05 1992, 1995, 1997	Arizona Department of Commerce Energy Office	The Seniors Helping Seniors Program is a retrofit program for senior residents conducted by seniors. The program provides both energy and water conservation education for senior residents and provides a degree of social service if necessary.	$40,000 $37,500 $44,790
Total Category Funding			**$397,931**

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Conservation Research and Planning			
ACC Institutional Constraint Resolution CA94PHM21 1994	Megecon	This grant funded a detailed investigation into the nature of the institutional constraints between the Department and the Arizona Corporation Commission and possible solutions. The Grantee identified many issues related to water conservation program cost recovery and provided an analysis and recommendations for resolution of the issues.	$30,000
Drip System Failures and Impacts CA95PHI19 1995	University of Arizona	The purpose of this grant is to: (1) investigate the causes of drip system failures in the Phoenix area and determine their horticultural and economic ramifications; (2) develop guidelines and techniques for design, installation, maintenance and operation for drip irrigation based upon findings from interviews, site inspections, laboratory analysis and literature review; and (3) promote the guidelines through educational materials such as demonstration models, booklets and workshops.	$117,969
Evaluation of Non-Per Capita Conservation Programs CA94PHM24 1994	University of Arizona	This grant was to assist municipal water providers in the Phoenix AMA in the measurement of water savings from existing conservation measures, determine key implementation factors and evaluate the potential savings of proposed conservation programs.	$19,000
Evaluation of Water Conservation Measures CA94PHM40 CA96PHM40 1994, 1996	Arizona State University Morrison Institute	This grant provided the groundwork for a systematic evaluation of conservation measures employed by water providers throughout the Phoenix AMA in order to meet the mandates of the 1980 Groundwater Management Act. A reference material/literature search and an assessment of residential water conservation efforts within the Phoenix AMA was provided. A second phase funded in 1996 is to develop a quantitative model which can be used by water providers for evaluating the costs and benefits of conservation measures.	$29,600 $62,000

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Evaporative Cooler Water Use in the City of Phoenix CA92PHM03 CA93PHM04 1992, 1993	University of Arizona	A study to determine the average volume of water used by evaporative coolers with and without bleed-off systems; the percentage of the volume of water used by the cooler as a portion of total household water use; and the ability of typical residential water meters to record the true volume of water utilized by coolers.	 $40,000 $20,000
Irrigation Requirements for Ground Covers CA94PHM29 CA94PHM29B 1994	Boyce Thompson Arboretum	The purpose of these grants was two-fold: (1) to identify new ground covers with potential use in low and middle elevation landscapes of Arizona; and (2) to quantify water use requirements for both new and currently used ground covers.	 $11,558
Minimum Irrigation Requirements for Trees CA93PHM06 1993	University of Arizona	This study identified the minimum irrigation requirements for three tree species common to urban landscapes in the Phoenix AMA, developed irrigation schedules for landscape professionals and homeowners and provided guidelines based on research. Two detailed brochures were produced.	 $57,358

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Multifamily Exterior-Interior Water Use Efficiency Evaluation CA95PHM12 CA97PHM01 1995, 1997	City of Mesa	The Grantee conducted a comprehensive study of two multifamily sites (one a high water use site and the other a low water use site) and identified water demand strategies that could improve the efficiency of each site's water use. The Grantee compiled background information; recommended two study sites; developed and conducted a demographic, water use and conservation knowledge survey; conducted a series of interior and exterior water use audits to identify water demand systems at each apartment complex; led a workshop for the participants of the study and provided recommended actions for each site along with a cost benefit analysis. Phase 2 (CA97PHM01) involves the implementation of site specific water management strategies (retrofits, landscape conversion and education) that were discovered in Phase I (CA95PHM12).	 $96,100 $186,470
Outdoor Misting System Efficiency CA95PHM09 1995	University of Arizona	The purpose of this grant was to investigate water usage and efficiency of outdoor misting systems and disseminate findings to the public.	 $18,797

APPENDIX 9
PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Residential End Use Study CA96PHM18 1996	Arizona Municipal Water Users Association (AMWUA)	The primary goals of this study were to measure where water is being used in a residential setting, create a comprehensive database about those uses and provide a resource to evaluate the penetration and effectiveness of existing conservation measures. This study employs portable data loggers and sensors fitted to the water meter at each monitored household. When coupled with basic survey information from each household, the data logging will reveal the variation in water use for each purpose according to factors such as fixture age, volume and frequency of use, household size, age of home, lot size, landscape type, and socio-economic factors. The regional database created will be combined with other study sites throughout North America to create a nationwide statistical water use model which will be able to predict water use for various end uses.	$70,600
Reuse of Industrial Process Water Study CA96PHI03 1996	City of Chandler	The focus of this project is to study the cost and type of treatment necessary to recycle industrial process water and assess the feasibility of its use in industrial and commercial cooling towers and on landscaping.	$50,000
Software for Design of Sloping Border Irrigation Systems CA94PHA20 1994	US Water Conservation Laboratory USDA/ARS	This grant developed a software program which aids in the design of sloping border irrigation systems with tailwater runoff.	$45,000
Tolerance Levels of Grass Varieties to Long-Term Effluent Use CA98PHI21 1998	University of Arizona	This project will determine tolerance levels of modern bermuda grass and perennial rye grass varieties (35 varieties of each grass) to long-term effluent use. The grasses will be grown inside a greenhouse hydroponics system developed by the University of Arizona. The grasses will be grown in a synthetic effluent which matches that of Phoenix effluent.	$22,098

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Turf Edge Effect Study CA98PHI15 1998	University of Arizona	This project will use microlysimeters and meteorological monitoring to determine: (1) how much turf evapotranspiration (ET) is increased at the interface between turfed and surrounding desert landscapes (the "edge effect"); and (2) how this enhancement of ET changes with distance from the turf/desert interface.	$67,196
Water Use Restrictions Through Model Ordinances CA95PHM04 1995	City of Surprise	The purpose of this grant is to develop model water conservation ordinances and guidelines for use by the City of Surprise as it develops its water distribution system and service as a water provider.	$50,000
Total Category Funding			**$993,746**

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Information and Education			
AZMET Turf and Crop ET Data Collection and Dissemination CA94PHI22 CA97PHM04 CA98PHI28 1994, 1997, 1998	University of Arizona	Grant funds were used to install AZMET (Arizona Meteorological Network) monitoring stations throughout the Phoenix AMA. The stations provide real-time data on water requirements for turf via E-Mail, FAX and the Internet and is particularly useful for large industrial turf customers (primarily golf courses). The stations also provide the data for lawn watering guides for the general public.	 $10,400 $6,000 $8,710
Computer Tracking System and Education Program CA93PHE10 1993	City of El Mirage	This grant funded an upgrade to the City's computer system that allows it to more effectively track the water use of its citizens. Included in the grant are funds to develop a program to educate employees and citizens about the importance of water conservation.	 $20,000
Conservation Public Awareness Program CA95PHM20 1995	Desert Botanical Garden	This grant funded efforts by the Desert Botanical Garden to increase public awareness of water conservation measures through its Center for Desert Living, which serves as the Garden's principle exhibit on the ornamental use of desert plants, desert horticulture and water and energy conservation strategies.	 $50,945
HydroSmarts Water Conservation Program CA98PHM25 1998	Kid's View Communica-tions Corp.	Expansion of an existing Tucson AMA project. The HydroSmarts Water Conservation Program is a creative and interactive program designed to educate young readers about water issues. The HydroSmarts feature is incorporated in the Bear Essentials News for Kids, a newspaper for school children ages 6 - 13. This grant provides funding for Kid's View to expand the program to the Phoenix area.	 $69,350

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Indoor Water Management Workshop CA92PHE10 CA93PHE13 1992, 1993	Alfred's Plumbing	Mr. Alfred Eichenger conducted workshops pertaining to indoor water management and indoor plumbing fixtures. CA92PHE10 required Mr. Eichenger to conduct 24 workshops demonstrating installation and operation of low-flow plumbing fixtures to high school students. CA93PHE13 demonstrated the same concepts to homeowners.	 $13,000 $13,000
Plant of the Month and Promotional Education CA95PHM13 CA96PHM04 CA97PHM03 1995, 1996, 1997	Arizona Nursery Association	Three grants were awarded to the Arizona Nursery Association for the development of an education program for nursery personnel, a plant of the month program and a video which was developed and will be available at nurseries in kiosks to assist in the education and promotion of low water use plants to the public. The 1997 grant was provided to further advertise plant of the month fliers and the video through radio station announcements.	 $50,750 $27,300 $30,000
Plumbing Fixture Workshop CA93PHE14 1993	Alfred's Plumbing	Mr. Eichenger taught indoor water management and installation and operation of low-flow indoor plumbing fixtures to junior high school students at five different schools.	 $4,825
Student Scholarships CA93PHE08 CA94PHM47 CA95PHM03 CA96PHM12 CA98PHM27 1993, 1994, 1995, 1996, 1998	Natural Resource Conservation Workshop for Arizona Youth (NRCWAY)	Grant money was used to cover the tuition of several high school students to the NRCWAY workshop, which is held for one week each year. Topics covered in the annual workshop are ecology, geology, hydrology, anthropology and forestry. The Department also supported this effort by supplying volunteer instructors.	 $3,150 $3,975 $4,680 $4,680 $4,125

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Teacher / Student Education Program and Booklet CA96PHM20 1996	Duncan Farms	Grant funds were used to design and construct a maze to instruct children about water conservation. Funds were also used to develop and publish 2,000 water conservation education booklets for teachers and 30,000 water conservation children's activity sheets.	$12,000
Technical Water Conservation Training for Industrial / Commercial CA94PHI02 CA95PHM33 1994, 1995	Arizona Municipal Water Users Association (AMWUA)	These grants funded workshops specifically geared to assist commercial and institutional facility managers with performing water audits of their facilities.	$6,200 $51,000
Water Conservation Curriculum for Junior High Schools CA92PHE08 1992	Arizona Municipal Water Users Association (AMWUA)	AMWUA developed a junior high school water conservation curriculum.	$35,000
Xeriscape™ Brochure CA93PHE11 1993	Arizona Municipal Water Users Association (AMWUA)	AMWUA created and distributed a Xeriscape™ brochure. It provided colorful pictures of Xeriscape™ landscaping options that were exceptionally well presented and provided names for all the plants portrayed.	$25,000
Total Category Funding			**$454,090**

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Recharge Facilities			
Cave Creek Water Reclamation Plant - Wetlands and Recharge Project AUG98PH03 1998	City of Phoenix	This project will design and construct a system of unlined wetlands and recharge basins in an urban area to further treat and recharge effluent generated at the Cave Creek Water Reclamation Plant. The recharge project will be designed to utilize high quality reclaimed water for recreation, habitat enhancement and augmentation of critical water resources by allowing recharge and aquifer storage.	$50,000
Recharge by Injection in Chandler AUG94PH26 INJECTION WELLS AT THE CHANDLER TREATMENT FACILITY AUG95PH06 1994, 1995	City of Chandler	This grant partially funded the construction, equipping and testing of a pilot injection well constructed in 1995 for the Chandler Effluent Treatment and Recharge Facility which will recharge 3,100 acre-feet of effluent per year at full-scale. A second phase of Recharge by Injection in Chandler (AUG94PH26), provided funding for the construction and monitoring of three injection wells which will serve to inject reverse osmosis treated effluent into the aquifer.	$50,000 $150,000
Total Category Funding			**$200,000**

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Recharge Study / Demonstration Projects			
Central Arizona Project and Effluent Study AUG94PH08B 1994	City of Surprise	This study conducted research on the recharge capabilities of two spreading basin sites in the City of Surprise -- an effluent site at the waste water treatment plant and a Central Arizona Project site at McMicken Dam. This grant demonstrated that recharge at both sites would be hydrologically feasible for a large-scale project and enabled the City to begin the design and permitting processes needed for full-scale recharge facilities.	$105,500
Feasibility of Cap Recharge in Goodyear AUG95PH08 CAP RECHARGE IN GOODYEAR AUG96PH08 1995, 1996	City of Goodyear	In AUG95PH08, the City of Goodyear studied the feasibility of recharging Central Arizona Project (CAP) water in the West Valley. Part of the study investigated the feasibility of transporting CAP water from the Beardsley Canal. The grant provided funding for a study of recharge alternatives and establishment of a direct delivery system through the Beardsley Canal by which the City's CAP allotment can be transported without expensive new infrastructure. The purpose of AUG96PH08 was to develop a detailed technical and hydrological study for the recharge of 120 acre-feet of CAP water delivered through the Beardsley Canal.	$22,311 $117,689
High Quality Recharge Study AUG94PH24 1994	Arizona State University	This project is studying the interactions of soil minerals with reverse osmosis-treated water, micro-filtered water, CAP water and specific blends of these waters to determine whether contaminants might be released in the vadose zone from these potentially corrosive source waters during groundwater recharge.	$56,797
Optimal Operation And Maintenance Techniques For Recharge Basins in Fine Grained Soils AUG98PH06 1998	City of Surprise	This grant provides funding for pilot recharge testing that will systematically evaluate the various methods of operation and maintenance and the effect those techniques have on the long-term sustainability of infiltration rates. This grant springboards from a previous grant that conducted pilot recharge testing and evaluation of design criteria for the City's effluent recharge facility.	$200,000

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Queen Creek Study AUG94PH13 1994	City of Mesa	This grant provided funding for the completion of a hydrologic feasibility study for storing water underground at the proposed Queen Creek Wash Underground Storage and Recovery Project. The study concluded that approximately 10,000 acre-feet of water can be recharged in the Queen Creek wash based on the size and conditions of the proposed recharge project site.	$21,000
Recharge and Reuse of Treated Effluent - Goodyear AUG95PH09 1995	City of Goodyear	The purpose of this grant is to develop a master plan for reuse and recharge of up to 21.00 million gallons per day of treated effluent produced at the Goodyear Wastewater Treatment Plant. The Reuse/Recharge Master Plan will develop the infrastructure to utilize the effluent for both direct use within the community and for recharge of the regional aquifer.	$75,330
Recharge Mounding Prevention Study AUG95PH10 1995	University of Arizona	This grant is developing a systematic general method to improve the operation of percolation recharge systems to avoid groundwater mounding problems. The project proposed to develop a methodology for determining the optimal infiltration application cycles and protective well pumping rates to maximize the overall economically feasible recharge rate.	$65,283
Soil Aquifer Treatment Optimization Study AUG94PH20 1994	Arizona State University	A study with the intent to develop a methodology for determining the optimal operation of soil aquifer treatment (SAT) systems to maximize infiltration under different constraints. The results may be used by engineers, agencies and consultants involved in the planning, operation and design of SAT systems.	$57,659

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Vadose Zone Demonstration AUG94PH18 1994	Town of Gilbert	The purpose of this ongoing project is to test the feasibility of recharging reclaimed wastewater into vadose zone injection wells (VZIW) in the vicinity of Gilbert's wastewater treatment plant. Once the VZIW is installed, the well performance will be monitored for a sufficient time to determine its suitability as compared to the infiltration spreading basins.	$51,500
Waddel Dam Recharge Study AUG94PH04 1994	Arizona State University	The purpose of this grant was to test the feasibility of recharging the aquifer with CAP water in the Agua Fria River basin downstream of Lake Pleasant, to develop a recharge plan and to enhance riparian wildlife habitat along the river below Lake Pleasant.	$30,910
Well Maintenance Technology For Tertiary Effluent AUG95PH16 1995	Arizona State University	This grant sought to determine if wells can be used to recharge effluent directly into water supply aquifers. All recharge systems utilizing effluent are susceptible to clogging over time as a result of biomass accumulation and physical filtration of suspended solids. The effectiveness of several disinfection schemes to control this clogging were to be investigated, as well as the ability of the aquifer to break down potentially hazardous disinfection by-products.	$77,558
Total Category Funding			**$881,537**

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PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Water Quality Enhancement and Reuse			
Avondale Wetlands Study AUG96PH03 1996	Arizona State University	ASU, in collaboration with the City of Avondale, is studying the City's nitrate treatment wetland-recharge demonstration project that will ultimately utilize 35,000 acre-feet of water annually, including 5,000 acre-feet of Central Arizona Project water. The wetland is needed to treat Salt River Project canal water which often exceeds the maximum contaminant level for nitrate.	$212,000
Central Arizona Project Groundwater Treatment Facility AUG95PH07 1995	City of Goodyear	The purpose of this grant was to provide assistance in developing a pilot study to identify design criteria for a treatment plant capable of treating both surface and groundwater in the same facility. This study will determine the feasibility of treating CAP water and high TDS groundwater in a conventional water treatment plant.	$124,800
Dairy Wastewater Treatment with Constructed Wetlands AUG94PH19 AUG97PH02 1994, 1997	University of Arizona	This project involves the construction of an experimental wetland facility to treat wastewater generated by a valley dairy operation. It will be used to assess the ability of this technology to produce water suitable for recharge and/or reuse in an environmentally sound manner. AUG97PH02 is a continuation and enhancement of AUG94PH19. It will increase, by 15 months, the length of time for operating and monitoring the performance of the wetlands, and the reuse and recharge components of the project.	$392,180 $159,138
Establish Wetlands Nursery for Avondale Wetlands AUG94PH28 1994	City of Avondale	The City of Avondale established a wetlands plant nursery as part of a future wetland treatment and recharge system (AUG96PH03). The goal of the nursery project was to observe and monitor indigenous growth and treatment characteristics provided by native plants transplanted from the Avondale Wastewater Treatment Plant discharge area, as well as give the Grantee the opportunity to raise its own plant material for the wetlands project.	$10,000

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Greywater Reuse and Impacts on Plants CA94PHM38 1994	Desert Botanical Garden	The purpose of this ongoing grant is to determine the effect of greywater on the growth and performance of selected ornamental desert plant species. The project is using greywater generated by the occupants of the Desert House which is located at the Desert Botanical Garden in Phoenix.	$59,025
Iron Induced Aquifer Treatment to Improve Water Quality AUG95PH15 1995	Arizona State University	This grant funded a study to determine if elemental iron is effective in dechlorinating certain organo-chlorine compounds under laboratory conditions. Organo-chlorine compounds are significant groundwater contaminants and, if successful, the use of elemental iron to degrade these contaminants may offer a more cost-effective method than is currently available to treat groundwater contaminated by these compounds.	$24,470
Mobile Water Treatment/Recharge Center AUG94PH30 1994	Arizona State University	The purpose of this grant was to develop a cost-effective portable system for filtering and improving the quality of raw water (such as runoff from the Salt and Verde rivers and CAP water) which could then be used for recharge.	$88,364
Study to Supply High Quality Water to the Town of Buckeye AUG96PH18 1996	Town of Buckeye	The purpose of this grant was to aid in the development of a water supply strategy for the Town of Buckeye that reduces the Town's dependence on poor quality groundwater and reduces the cost of water to residents of the Town. The study was to identify sources which would be renewable, adequate to provide for future growth, of acceptable quality and available at a reasonable price.	$31,500
Tres Rios Constructed Wetlands Study AUG94PH03 AUG97PH01 1994, 1997	City of Phoenix	An ongoing study to test the capability of constructed wetlands to upgrade the present quality of treated sewage effluent of the 91st Avenue Wastewater Treatment Plant to levels that will satisfy expected National Pollutant Discharge Elimination (NPDES) Permit requirements. AUG97PH01 is a continuation of AUG94PH03 and will partially fund additional studies of the constructed wetlands.	$150,000 $40,500
Total Category Funding			**$1,291,977**

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PHOENIX ACTIVE MANAGEMENT AREA GRANTS

Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Xeriscape™ Demonstration Gardens / Design Guides			
Botanical Walk at Superstition Springs CA94PHM23 1994	City of Mesa	A project designed to enhance the Botanical Walk at Superstition Springs Mall. A four-color low-water use plant brochure was designed and printed with a portion of the grant funds, which listed characteristics of plants found in each of three desert regions. Entrance monument signs, desert region signs and plant identification signs were designed, created and installed. A maintenance manual was also developed.	$15,000
Boyce Thompson Arboretum/ Interpretive Signs CA94PHM27 1994	Boyce Thompson Arboretum	Interpretive signs were created for inclusion into a demonstration garden of low-water use plants. The signs targeted important water conservation concepts and explained the functionality of low-water use plants. Topics depicted included water efficient landscapes, water harvesting, concentration of salts in water and soils and designing water efficient gardens.	$20,000
Do-it-yourself Xeriscape™ Design Guide and Demonstration Area CA98PHM01 CA98PHM02 CA98PHM03 1998	Human Productivity Center and Arizona Municipal Water Users Association	A collaboration of efforts between the public and private sectors to develop and distribute Xeriscape™ design guides to new home buyers and existing homeowners in the Phoenix AMA. Instructional Xeriscape™ design booklets will be prepared along with customized landscape templates, primarily for new single-family home buyers. Step-by-step procedures will be addressed for landscape and irrigation system design and installation. Long-term maintenance information will be provided. Xeriscape™ landscapes will be installed and maintained as public demonstration areas and educational workshops will be a component of the overall project.	$680,000

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Grant Title Grant Number Year(s) Funded	Grantee	Description	Funding Amount
Master Gardeners/ Trail Guide and Sign Construction CA94PHM25 1994	Arizona Master Gardeners, Inc.	The Master Gardener Program, working in conjunction with the Maricopa County Extension Office, created signs and a Trail Guide pamphlet for use at a demonstration garden and interpretive trail designed to illustrate efficient water use techniques for the Sonoran Desert. The site is located at the Maricopa County Extension Office.	$4,500
Xeriscape™ Demonstration Garden CA94PHM30 1994	City of Tempe	A Xeriscape™ demonstration garden was created in Tempe at the Tempe Women's Club Park. Plants and signs were installed in an area that had already been in use as a storm water retention basin.	$20,000
Total Category Funding			**$739,500**
Total Funding for All Categories			**$6,470,232**